

## LIVERMORE LAB REPORT

**A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, July 25-29, 2011**



UP, UP AND AWAY



With the end of the space shuttle program last week, NASA moves on to a new chapter in space exploration.

The space shuttle coming to a close after 30 years brought back fond memories for Lab scientists and astronauts Tammy Jernigan and Jeff Wisoff, who just happen to be married.

Jernigan flew five space missions and Wisoff flew four. "We made that transition from the shuttle program a while back, but as we look back on that, it is a tough time to say goodbye," Wisoff said.

Jernigan said it likely will be some time before humans fly in space again. "With the shuttle program shutting down after its extraordinary 30-year history, there's a gap in America's ability to place humans into space," she said. "But in time, human exploration will continue."

And what did the two astronauts remember the most about their experience: "You get into orbit and the first time you look out the windows, you see how beautiful and precious the Earth looks from space and everybody you know is on that beautiful blue ball," Wisoff said. "It gives you a sense of the importance of taking care of it."

To hear the full interview, go to the [Web](#).



## GETTING GREEN WITH CHINA



**LLNL Deputy Director of S&T Tomas Diaz de la Rubia and Dr. Xu Shisen, president of the Clean Energy Research Institute and chief engineer for Huaneng in China**

The Laboratory has signed an agreement with the Clean Energy Research Institute in China to conduct joint research and development of clean energy technologies.

The Clean Energy Research Institute was formed by Huaneng Power International Inc.

Under the memorandum of understanding, LLNL will create a stronger relationship with Huaneng and both parties will conduct research analysis and data exchange as established under the U.S.-China Clean Energy Research Center (CERC) that was set up last year.

The two parties will exchange information and technology on carbon capture and sequestration (CCS), enhanced oil recovery, shale gas and power engineering.

Specifically, LLNL brings expertise in CCS, advanced material science, engineering and design, and energy systems analysis.

To read more, go to the [Web](#).



## WHAT'S IN STORE? IT'S A GAS



### **BMW expanded its landfill gas-to-energy program in 2009.**

BMW Manufacturing Co. is collaborating with LLNL on an ongoing project to develop efficient storage of hydrogen for use in future motor vehicles.

The Lab's project to produce and store cryo-compressed hydrogen is part of BMW's pilot program to convert landfill gas into hydrogen that could be used to fuel material handling equipment.

In addition, BMW is working with the Department of Energy to efficiently store hydrogen via a liquid organic carrier.

These projects are part of a portfolio of innovative concepts that are intended to enable industry to achieve long range zero-emissions vehicles on the roads across America.

To read more, go to the [Web](#).

### **ALL'S FAIR IN SCIENCE AND ENGINEERING**



**Top science fair winners (from left ) Christina Ren, Ray Zhou , Matthew Feddersen and Blake Marggraff get a look inside the Lab's Terascale Simulation Facility.**

Last week, the Lab hosted the top winners of the 2011 Intel International Science and Engineering Fair (ISEF).

Matthew Fedderson, 17, and Blake Marggraff, 18, recent graduates of Acalanes High School in Lafayette, Calif., captured the top prize, the Gordon E. Moore Award, and \$75,000, for developing a potentially more effective and less expensive cancer treatment .

Joining the pair during the visit were Christina Ren and Ray Zhou, two of the top sweepstakes winners at the Lab-sponsored Tri-Valley Science and Engineering Fair (TVSEF) held in March.

Ren, of Monte Vista High School, won for "Ways to Enhance Cell Regeneration," a project that has practical applications for treating military wounds that also gained her an award by the U.S. Army at this year's ISEF.

Zhou, of Amador Valley High School, won for "Near-Infrared Light Biostimulation: A Novel Approach to the Optimization of Industrial Biosynthesis." This project could prove beneficial as a cost-effective way to accelerate biosynthesis of drugs and vaccines.

The students met with Lab scientists, conducted discussions about their winning projects and took tours of the Terascale Simulation Facility, National Ignition Facility and Center for Accelerator Mass Spectrometry.

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LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

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